SECTION FIVE

ANALYSIS OF FACILITY-LEVEL IMPACTS

This section presents the facility-level economic impact methodology and reports the results of the facility economic impact analysis (closure analysis). This analysis, described in Section 5.1, uses output from the cost annualization model (discussed in Section Four) to predict facility closures. Section 5.2 summarizes the results of the analysis in terms of the number of facility closures that occur prior to regulatory compliance (baseline closures) and presents the number of facility closures that result from regulatory compliance (incremental closures). Section 5.3 discusses impacts on new sources.

This section discusses the impacts on 206 facilities.[1] There are 286 facilities in the survey universe. Four facilities provided insufficient data to measure impacts. Of the remaining 282 facilities with sufficient data, 148 facilities are not directly considered by the facility closure model. These 148 facilities comprise two groups: certifying facilities and single-facility firms. These latter two groups and the reasons they are not directly considered by the model are described below.

EPA exempted facilities from providing facility-level data if the company owners certified that the regulation would have no economic impact on the facility. Seventy-two facilities (weighted) certified no economic impact on the facility (i.e., the rulemaking will be economically achievable for the company and its certified facilities). The 72 certifying facilities, are placed automatically in the "no-closure" category by the facility closure model. Another 76 facilities in the survey universe indicated that their owner firm and the facility are the same entity (i.e., the firm owns only one facility). In these cases, the firm-level analysis in Section Six was determined to be the appropriate level at which to evaluate impacts on these facilities. This approach avoids double counting of impacts at both the firm level and facility level for these single-facility firms. Results of the analysis show impacts relative to the 134 "nonindependent" facilities that are owned by multifacility firms and that provided sufficient survey data. These facilities are the primary focus of the facility-level analysis. The 72 certifiers are added to the no-impact results for a total of 206 facilities discussed in this analysis.

---

[1] Options for new sources are evaluated later in Section 5.3. See Section Four for a description of all regulatory options.

5.1 FACILITY IMPACT MODEL

In this analysis, EPA estimates facility impacts by evaluating the impact of compliance costs on a facility's earnings.[2] To do this, EPA compares each facility's average annual precompliance, posttax earnings with its annualized pollution control costs.

The present value of earnings represents the value in current dollars of the expected earnings that the facility can generate over a specified period (in this case 16 years; see below). If the present value of future posttax earnings is expected to be less than or equal to zero, EPA assumes that the facility would cease operation, as it would no longer be a profitable venture.

Posttax earnings are used instead of pretax earnings because it is not appropriate to compare a pretax number (earnings) to a posttax number (compliance cost). There are a number of highly conservative assumptions that are embodied in this approach, however. First, posttax earnings can be substantially smaller than posttax cash flow since posttax cash flow is defined as posttax earnings plus depreciation. Using posttax earnings could therefore overstate actual baseline closures, possibly leading to unreliable estimates of postcompliance closures. However, to ensure that postcompliance closures are not understated, EPA does investigate impact on facilities, even if they are estimated to close in the baseline, by investigating impacts at the firm level as well (see discussion in Section 5.1.2). If the firm cannot install and operate pollution control equipment at all of its facilities, including those estimated to close in the baseline, without being threatened by bankruptcy, then impacts on the firm and its facilities are identified. Second, compliance costs, as calculated in Section Four, are really calculated based on cash outflows. Because the present value of compliance costs is calculated on the basis of the assumption that capital costs are a cash outflow in Year 1, the present value of compliance costs is higher than it would have been had the present value been calculated on the basis of O&M plus depreciation costs (which occur in small increments over 16 years); i.e., the change in posttax earnings. To be conservative and to avoid the criticism that a change in posttax earnings does not account for capitalization costs, EPA uses the present value of compliance costs calculated as described in Section Four to compare to posttax earnings. This approach creates a conservative measure of impact that, nevertheless, has no true basis in general accounting practices.

---

[2] Ideally, the impact of compliance costs would be judged against a facility's cash flow, but EPA did not have access to data that would have allowed the Agency to determine cash flow.

The methodology used to determine closures is somewhat of a departure from other EAs and Economic Impact Analyses (EIAs) for effluent limitations guidelines and standards in which salvage value (the residual value of the facility at liquidation) was considered to play a role in an assessment of the financial viability of a facility (i.e., the decision to liquidate would be based on whether the estimated salvage value exceeded the estimated present value of cash flow). For a number of reasons, EPA believes that using salvage value in this way for this industry could overstate baseline closures, leading to an unreliable estimate of postcompliance closures. First, the appropriate use of salvage value is in comparison to cash flow. Without knowing depreciation, EPA cannot construct cash flow. Using salvage value without considering depreciation could seriously overstate baseline closures. Second, facilities in this industry are not necessarily profit centers. They may be transferring product at cost (i.e., operating cost only) or are otherwise not expected to be self-supporting. Third, the computation of salvage value has always been difficult, and many errors can arise because of the numerous assumptions that must be made. Fourth, liquidation costs also must be weighed against salvage value, and these costs can be even more difficult to estimate than salvage value, given the lack of the site-specific data needed to estimate the costs. Using salvage value without considering liquidation costs would also overstate baseline closures. Finally, one commenter also stated that using salvage value overstated baseline closures and was concerned that postcompliance results might thereby be understated. EPA believes the results of the closure analysis are more accurate without the use of salvage value, both in the baseline and postcompliance. For these reasons, EPA has changed the methodology and does not use salvage value in determining closure.

Section 5.1.1 describes the calculations used to determine the present value of future posttax earnings for a facility, and Section 5.1.2 discusses how closure results are evaluated using the facility impact model.

5.1.1 Estimating the Present Value of Forecasted Earnings

As stated previously, the present value of each facility's posttax earnings is equal to its future stream of posttax earnings in current dollars. The impact methodology uses survey data on earnings to estimate future earnings and then applies a discount rate to derive the present value of future earnings. The components of this analysis include: (1) estimating current posttax earnings; (2) estimating the present value of future posttax earnings, which involves projecting earnings during the relevant time frame and discounting

them to the present; and (3) evaluating impacts (adjusting the regulatory baseline for baseline closures and incorporating the incremental costs of regulation).

5.1.1.1 Estimating Current Earnings

EPA estimated current earnings based on value of shipments of pharmaceutical and nonpharmaceutical items minus the costs of operations (which include some measure of depreciation for buildings and possibly equipment as well) as reported in the Section 308 Survey. This measure is thus an approximation of earnings before interest and taxes. Respondents generally provided three years of data (1988, 1989, 1990), which were adjusted to 1990 dollars using the change in CPI for SIC 283 over those years. EPA then averaged the three years of data to create base year earnings.[3] EPA then adjusted earnings by the marginal tax rate of the owner firm to create an estimate of current annual posttax earnings.

5.1.1.2 Estimating the Present Value of Future Earnings

Current annual posttax earnings can be used to estimate the present value of future earnings by setting a time frame for the analysis (16 years, as discussed in Section Four), defining any trends or cycles that the affected industry's earnings might follow, and discounting the earnings projected over the time frame to the present time.[4]

EPA has determined that a slightly rising earnings forecast over the defined 16-year period (see Section Four) best fits the data provided in the Section 308 Survey as well as that from other sources (see Section Three). In general, the surveyed facilities in the postcompliance facility closure analysis discussed in Section 5.2.2 had a median increase in posttax earnings of 4.2 percent between 1988 and 1990. Between 1988 and 1989, the surveyed facilities showed a small real decline in earnings (median of -3.4 percent).

---

[3] EPA made one exception for a facility that came online in 1990. EPA used the 1990 data by itself, rather than averaging the data with the previous years' data (which were zeros).

[4] The earnings period and the cost annualization period are the same to keep the annualized costs comparable to earnings. Otherwise either earnings or annualized costs might be overstated relative to the other.

Growth surged, however, between 1989 and 1990 (median of 6.8 percent) to more than make up for the previous decline. Note that shipments also increased 4.5 percent over those years in SIC 283 (see Table 3-4 in Section Three). To be conservative, EPA models growth in the industry as flat (thus avoiding the assumption that the industry can "grow" its way out of financial impacts). Because general industry information indicates that this industry is neither cyclical nor declining (see Section Three), EPA expects the flat earnings growth projection to yield a reasonable estimate of the present value of future earnings.

To represent this flat earnings growth, EPA used base-year earnings (see Section 5.1.1.1) in constant 1990 dollars and assumed they would remain constant over the 16-year period of analysis, using a real (not a nominal) discount rate. The same cost of capital factor (discount rate) used in the cost annualization model is used to discount earnings.

5.1.2 Evaluating Impacts

Establishing the Regulatory Baseline

OMB directs agencies to develop a regulatory baseline against which to judge impacts. OMB's guidance states:

> The benefits and costs of each alternative must be measured against a baseline. The baseline should be the best assessment of the way the world would look absent the proposed regulation. That assessment may consider a wide range of factors, including the likely evolution of the market...[5]

EPA must assess the impacts of the Final Pharmaceutical Industry Effluent Guidelines against a baseline that is the Agency's best assessment of the way the world would look without the regulation. In this analysis, EPA has established three baselines. Baseline 1 is a baseline in which EPA has considered neither effluent guideline compliance costs nor MACT standards compliance costs for facilities that are subject both to MACT standards costs and effluent guidelines costs. Baseline 2 adjusts posttax earnings to reflect the posttax change in earnings that will occur given the costs of MACT standards that are associated with

[5] OMB,1996. *Economic Analysis of Federal Regulations under Executive Order 12886*. January 11.

wastewater emission controls. Baseline 3 further adjusts Baseline 2 posttax earnings to reflect the change in earnings associated with the costs of total MACT standards costs. See Section Two and Appendix B of this EA for more details on MACT standards requirements and costs.

Impacts in this and subsequent sections will be presented as incremental to all three baselines. EPA presents impacts this way because the two final rules (MACT standards and the Final Pharmaceutical Industry Effluent Guidelines) will be signed nearly concurrently. The three baselines allow EPA to properly assess the impact of this rulemaking both individually and with MACT standards requirements in place.

Under all three baselines, if a facility's present value of posttax earnings is less than or equal to zero over the 16-year time frame, EPA's best estimate is that this facility is a baseline closure independent of the impact of this proposed rule. Although it is possible that a facility estimated to be a baseline closure might remain open, the converse also might be true—a facility projected to remain open until it is subject to the rule might actually close independently of the rule. Either result might be likely. If EPA were to assume that all facilities that are estimated to close in the baseline were actually postcompliance closures, this would seriously overstate impacts. To avoid either seriously overstating or understating impacts, EPA has chosen to estimate postcompliance closures by counting facilities that are projected to close solely due to the effects of the Final Pharmaceutical Industry Effluent Guidelines and/or MACT standards rule.

Furthermore, EPA assesses impacts on nonindependent facilities (facilities that are owned by multifacility firms) that are estimated to close in the baseline by investigating whether the firm can continue to support the facility in the firm failure analysis. The nonindependent facilities with negative or zero operating earnings as reported in the Section 308 Survey are assumed likely to be subsidized by their owners, since they are not supporting themselves currently. If they are being subsidized in the baseline, then EPA can assume they will continue to be subsidized postcompliance, as long as the firm can afford to continue to support all of its facilities postcompliance (which is analyzed in Section Six).[6]

For all of these reasons, EPA creates a regulatory baseline by first evaluating the *current* baseline (represented by the data collected in the Section 308 Survey) and determining which facilities are likely to

[6] The analysis in Section Six shows that all multifacility firms with facilities that close in the baseline can install and operate pollution control without major financial impacts.

close regardless of regulatory requirements, as directed by OMB Guidance. The facilities that are not expected to close are then used to establish the *regulatory* (as opposed to the current) baseline.[7] This regulatory baseline is the one against which incremental impacts in the postcompliance closure analysis are measured.

In analysis of the *current* baseline, EPA uses the model as described above to calculate the present value of the earnings stream over the 16-year time frame. If a facility's present value of posttax earnings (current baseline posttax earnings), as reported in the survey, is less than or equal to zero, EPA classifies that facility as a "baseline closure." These "closure" facilities are eliminated from the regulatory baseline used in the subsequent, postcompliance closure analysis either because (1) such closures are expected to occur regardless of the Final Pharmaceutical Industry Effluent Guidelines, and therefore cannot be attributed to increased regulatory costs, or (2) because the closure analysis is irrelevant, and the appropriate level of analysis is at the firm level (for nonindependent facilities that are not self-supporting). When baseline closures are removed, the current baseline becomes the regulatory Baseline 1.

EPA adjusts Baseline 1 to create Baseline 2 by incorporating the change in posttax earnings associated with the MACT standards wastewater emission control costs. The change in posttax earnings is generated by the cost annualization model and is used as described below for incorporating compliance costs of the Final Pharmaceutical Industry Effluent Guidelines. The same procedure is also used to incorporate the change posttax earnings associated with Total MACT standards costs to create Baseline 3. Baseline closures are assessed for all three baselines.[8]

Incorporating Compliance Costs

For the postcompliance closure analysis, EPA calculates the impacts of the Final Pharmaceutical Industry Effluent Guidelines costs on earnings using the facility-specific posttax present value costs for each regulatory option (see Section Four) in comparison to the three regulatory baselines. The present value of

[7] In this case, three regulatory baselines are created, as discussed earlier in this section.

[8] Note that any baseline closures attributed to Baseline 2 or Baseline 3 are attributed to the costs of complying with MACT standards requirements.

compliance costs is then subtracted from the present value of Baseline 1, 2, and 3 posttax earnings to compute each facility's postcompliance posttax earnings under the three regulatory baselines.[9]

Note that this analysis assumes that no costs will be passed through to consumers, which is considered extremely conservative in this analysis of industry impacts (i.e., tends to overstate impacts on industry). However, when impacts on consumers are estimated in Section Eight, EPA assumes that *all* costs are passed through to consumers. Neither assumption is realistic, but provides upper bound estimates of impacts on both industry and consumers.

After computing postcompliance earnings, the model notes for which facilities the present value of earnings are less than or equal to zero and classifies these facilities as postcompliance closures attributable to the Final Pharmaceutical Industry Effluent Guidelines under all three baselines. The number of estimated closures is recorded for all nonindependent and certifying facilities.

5.2 RESULTS

5.2.1 Baseline Closures

Table 5-1 presents the results of the analyses used to identify baseline closures under the three baselines. Under Baseline 1, 18 facilities out of 206 nonindependent and certifying facilities (8.7 percent) are estimated to close regardless of regulatory requirements.[10] All of these facilities are assessed further in the firm analysis to determine whether their firms can afford to install and operate pollution control equipment, on the assumption that these facilities might not be expected to be self-supporting. No additional facilities close under Baseline 2 or 3 (thus MACT standards costs by themselves will not have a major impact on the facilities analyzed in this EA).

---

[9]As noted earlier, because the cost annualization model really computes annualized and present value cost on a cash flow-type basis, the change in earnings is slightly overstated.

[10] A total of 206 weighted facilities remain in the analysis after excluding 4 facilities with insufficient data and 76 single-facility firms.

Table 5-1

Baseline Facility Closures

Facility Type	Total Number of Facilities	Baseline 1 Closures		Baseline 2 Closures		Baseline 3 Closures	
		Number	% of Total	Number	% of Total	Number	% of Total
Direct Discharge							
A/C	20	1	0.5%	1	0.5%	1	0.5%
B/D	13	1	0.5%	1	0.5%	1	0.5%
Indirect Discharge							
A/C	64	3	1.5%	3	1.5%	3	1.5%
B/D	105	13	6.3%	13	6.3%	13	6.3%
Zero Discharge							
A/C	2	0	0.0%	0	0.0%	0	0.0%
B/D	2	0	0.0%	0	0.0%	0	0.0%
All Facilities							
Total *	206	18	8.7%	18	8.7%	18	8.7%

* Note: Total does not include four facilities with insufficient data.

Source: Section 308 Survey Data and the Pharmaceutical Industry Facility and Firm Model, EPA, 1998.

5.2.2 Postcompliance Closures

Under Baselines 1 and 2, for the Final Pharmaceutical Industry Effluent Guidelines options, no facilities are expected to close (see Table 5-2). Only in Baseline 3 (with all MACT standards costs considered) does one facility (an A/C indirect discharger) close under the selected options. Note that these results apply only to facilities owned by multifacility firms. The likelihood that single-facility firms might fail and close postcompliance is investigated in Section Six.

5.3 IMPACTS ON NEW SOURCES

The selected options for new sources are equivalent to the selected options for existing sources. Because the costs for designing pollution control technologies are generally no more expensive than and are usually less expensive than retrofitting pollution control technologies, costs for new facilities will be no more expensive than costs for existing facilities. Because EPA has shown that the requirements for existing sources are economically achievable, they should be economically achievable for new sources. Furthermore, since the requirements for new sources will not be more expensive than those for existing sources, the rule will not pose a barrier to entry for new sources.

In response to proposal comments, EPA investigated whether impacts from the effluent guidelines rule (with and without MACT standards costs included) might contribute to firms locating new facilities in foreign countries. EPA devised a methodology to compare to the compliance costs of the Final Pharmaceutical Industry Effluent Guidelines and MACT standards rule to typical startup costs for new facilities. Several facilities in the Section 308 survey started up during the 1988-1990 time frame. For these very new facilities, EPA assumed that their total assets reported in the survey would be a reasonable proxy for the capital necessary to build and outfit a new facility. Although some startup capital is used to pay for intangibles or other nonasset items, total assets among new facilities should be a conservatively low estimate of startup capital. EPA then compared compliance costs to total assets at each newer facility. EPA found the median percentage of the capital costs of compliance (including MACT standards costs) to build a new facility would be negligible (0.21 percent of startup costs at newer surveyed facilities). Thus compliance costs

Table 5-2

Postcompliance Facility Closures

Options	Baseline 1			Baseline 2			Baseline 3		
	Total Number of Facilities	Postcompliance Closures		Total Number of Facilities	Postcompliance Closures		Total Number of Facilities	Postcompliance Closures	
		Number	% of Total		Number	% of Total		Number	% of Total
Direct Discharge									
BAT-A/C (with BPT)	19	0	0.0%	19	0	0.0%	19	0	0.0%
BAT-B/D (with BPT)	12	0	0.0%	12	0	0.0%	12	0	0.0%
Indirect Discharge									
PSES-A/C	61	0	0.0%	61	0	0.0%	61	1	0.5%
PSES-B/D	92	0	0.0%	92	0	0.0%	92	0	0.0%
All Facilities									
Total Selected Options *	188	0	0.0%	188	0	0.0%	188	1	0.5%

* Total includes five nondischarging facilities; does not include four facilities with insufficient data.

Source: Section 308 Survey Data and the Pharmaceutical Industry Facility and Firm Model, EPA, 1998.

associated with Final Pharmaceutical Industry Effluent Guidelines and/or the MACT standards rule are unlikely to be a major impetus to locating new facilities outside the United States.